

Open position in philosophy of physics: PhD Fellowship – Geneva Symmetry Group, Department of Philosophy, University of Geneva

The Department of Philosophy, University of Geneva invites applications for a position for Christian Wüthrich's new SNSF-funded project PHILOSOPHY BEYOND STANDARD PHYSICS:

- one 4-year PhD Fellowship.

The project will be housed at the Geneva Symmetry Group, which is part of the Department of Philosophy of the University of Geneva (<https://genevasymmetrygroup.wordpress.com/>).

The position will start on 1 September 2022 or as soon as possible thereafter.

PhD candidates must have completed an MA degree in philosophy or in physics. Successful candidates are expected to have a strong background either in philosophy of science or in advanced physics and some preparation to do work in the other field, such as course work. Relevant background in philosophy is philosophy of physics, general philosophy of science, metaphysics, and epistemology; in physics, it is quantum theory and cosmology and, if possible, quantum field theory and GR.

Candidates must have excellent communication skills in English. Proficiency in French is not necessary at the time of application (but PhD candidates will eventually have to pass a French exam before submitting their thesis).

Applications from members of groups that are currently underrepresented in academic philosophy are strongly encouraged.

The application dossier must contain the following:

PhD candidates:

- cover letter explaining your interest in the topic, including a brief description of the direction of research you would like to undertake in the context of 'Philosophy Beyond Standard Physics' (more information about the project than what can be found below is available upon request) - CV - Master thesis - 2 names and e-mail addresses for potential academic references

Please send applications by email as a single PDF file named simply [your last name].pdf showing your email address on top.

Please send applications and queries to Christian Wüthrich at christian.wuthrich@unige.ch

To ensure full consideration, please send applications by 15 June 2022.

Brief description of the project

PHILOSOPHY BEYOND STANDARD PHYSICS

There must be physics beyond the central two pillars of contemporary fundamental physics, the standard model of particle physics and general relativity, as quantum matter and gravity must be brought into meaningful contact. This is the task of quantum gravity, physics's greatest challenge on the path to complete the unfinished revolution that quantum physics and relativity initiated. The challenge of quantum gravity exhibits inextricable physical, mathematical, and philosophical aspects. The physical and philosophical angles come into particularly sharp relief where the interaction between gravity and quantum matter is most energetic: in the very early universe right after the big bang, where quantum gravity intersects with cosmology.

The central aim of the present project is to tackle the philosophical labour accruing at this intersection. Although the philosophy of quantum gravity and the philosophy of cosmology have come of age recently, their overlap---as central as it is---remains underdeveloped. This project thus ventures into philosophically largely uncharted territory. It does it in three ways, structured into three subprojects. In Subproject A, we propose to investigate how different approaches hint at new physics. One such approach deals with the use of models, where we study the models' promise, function, and limitations in tracking down possible signatures of quantum gravity through two specific examples, the Standard Model Extension framework and cosmology's concordance model, Λ CDM. A second approach concerns the development of new theories from first principles through theories of emergent gravity. We study the connection of these new theories to phenomenology and whether they require a recalibration of our standards of confirmation. We thus study the interaction between theory and experiment at physics's frontier where neither theory nor experiment are settled. In Subproject B, we argue that a version of the quantum measurement problem forms an irreducible part of understanding quantum gravity and quantum cosmology. In particular, its solution constitutes a keystone element of the emergence of a determinate geometry of spacetime from the quantum indeterminacy of the fundamental structures. We will pay particular attention to Everettian strategies in the context of both quantum gravity and cosmology. In Subproject C, we examine the connection between spacetime singularities and theories of quantum gravity and argue that the study of singularities may play a key role in developing new physics beyond the standard one. With reference to the role of the big bang singularity, we address the question of a atemporal and temporal forms of emergence of spacetime with a special focus on whether these two ways in which spacetime emerges can be understood in a single unified account.

This project breaks new ground in the way it combines the philosophy of quantum gravity and the philosophy of cosmology. It will be of timely relevance to philosophical inquiries regarding the fundamental structure of the world and the emergence of spacetime and a determinate world more generally, as well as about how science works in a domain where its methods operate at their limits (and perhaps beyond) and how it constructs and confirms its theories. Consequently, apart from philosophers of physics, it will also be of great interest to wider audiences in philosophy, particularly in general philosophy of science, metaphysics, and epistemology. Its interdisciplinary nature, engaging with cutting-edge science at close range, and its contributions of characteristically philosophical skills to the debate, promise to make it concretely relevant to both physics and philosophy.